

WE CLAIM:

1. An ophthalmic apparatus comprising:
an eye-positioning device for assisting a subject in positioning an eye in a
desired position for administering a fluid to the eye; and
5 an applicator for dispensing the fluid into the eye when the eye is in the
desired position.
2. The apparatus of claim 1, wherein the eye-positioning device
comprises:
10 an eye-position detector for detecting the position of the eye; and
a feedback mechanism for receiving information from the eye-position
detector corresponding to the position of the eye, and providing feedback
information to the subject so that the subject can move the eye to the desired
position.
- 15 3. The apparatus of claim 2, wherein the feedback mechanism is
operable to provide audible cues that assist the subject in moving the eye to the
desired position.
- 20 4. The apparatus of claim 2, wherein the feedback mechanism is
operable to provide visual cues that assist the subject in moving the eye to the
desired position.
5. The apparatus of claim 1, wherein the eye-positioning device
25 comprises a display for displaying a real-time image of the eye and a target, such
that when the eye is aligned with the target, the eye is in the desired position.
6. The apparatus of claim 1, wherein the eye-positioning device
comprises:
30 an image pick-up device for capturing an image of the eye; and
an image processor for processing the image of the eye and determining
whether the eye is in the desired position for administering the fluid to the eye.

7. The apparatus of claim 6, wherein the image pick-up device comprises a CCD camera.

5 8. The apparatus of claim 6, wherein the eye-positioning device further comprises a feedback device operable to output feedback signals to the subject, the feedback signals corresponding to directions for moving the eye to the desired position.

10 9. The apparatus of claim 1, wherein the applicator comprises:
a frame for wearing on the head of the subject; and
a fluid dispenser supported by the frame proximate the eye of the subject,
the fluid dispenser configured to dispense fluid into the eye.

15 10. The apparatus of claim 9, wherein the frame comprises a spectacle frame.

11. The apparatus of claim 9, wherein the fluid dispenser comprises a jet dispenser.

20 12. The apparatus of claim 11, wherein the fluid dispenser comprises a piezoelectric jet dispenser.

25 13. The apparatus of claim 11, wherein the fluid dispenser comprises a thermal droplet jet dispenser.

14. The apparatus of claim 9, wherein the applicator further comprises a controller operable to actuate the fluid dispenser.

30 15. The apparatus of claim 14, wherein the controller is operable to control the fluid dispenser to dispense a predetermined dosage of fluid into the eye.

16. The apparatus of claim 9, wherein the applicator further comprises a fluid reservoir for storing the fluid and delivering the fluid to the fluid dispenser.

5 17. The apparatus of claim 1, wherein the applicator comprises:
a jet dispenser having a plurality of ejection orifices; and
a controller operable to control the jet dispenser to dispense fluid from one or more selected ejection orifices.

10 18. The apparatus of claim 1, further comprising a user interface program for acquiring user input for setting one or more operating parameters of the apparatus.

15 19. The apparatus of claim 18, wherein the user interface program comprises a graphical user interface element for setting one or more operating parameters of the apparatus.

20 20. An ophthalmic apparatus, comprising:
an eye-position detector for detecting the current position of an eye of a subject; and
a feedback device for providing feedback information that assists the subject in moving the eye from the current position to a predetermined position for administering a fluid to the eye.

25 21. The apparatus of claim 20, further comprising a dispensing apparatus for dispensing a fluid into the eye when the eye is in the predetermined position.

30 22. The apparatus of claim 21, wherein the dispensing apparatus comprises a spectacle frame for wearing on the head of the subject and a fluid dispenser carried by the frame and configured to propel fluid into the eye.

23. The apparatus of claim 20, wherein the eye-position detector comprises an image-capturing device for capturing an image of the eye and a processor for processing the image to determine the current position of the eye relative to the predetermined position.

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24. The apparatus of claim 23, wherein:
the image-capturing device is operable to output a digitized image of the eye; and

the processor is operable to receive the digitized image, process the
10 image to determine the current position of the eye relative to the predetermined position, and output a signal corresponding to the current position of the eye relative to the predetermined position; and

the feedback device is operable to receive the signal from the processor
and output a feedback signal that assists the subject in moving the eye to the
15 predetermined position.

25. The apparatus of claim 22, wherein the eye-position detector comprises:

a digital camera for generating an image at the eye, the camera being
20 supported by the frame; and

a processor for processing the image to determine the current position of the eye relative to the predetermined position.

26. The apparatus of claim 25, wherein the processor comprises a
25 controller, the controller being operable to control the fluid dispenser to dispense the fluid.

27. The apparatus of claim 26, wherein the controller controls the fluid
dispenser to dispense the fluid when the processor detects that the eye is in the
30 predetermined position.

28. An ophthalmic apparatus for administering a liquid to an eye of a subject, comprising:

detecting means for detecting the position of the eye; and

5 dispensing means for dispensing the liquid into the eye when the eye is in a predetermined position.

29. The apparatus of claim 28, wherein the detecting means comprises: means for capturing an image of the eye; and

10 processing means for detecting the position of the eye relative to the predetermined position based on the image of the eye.

30. The apparatus of claim 28, further comprising feedback means for providing feedback to the subject to assist the subject in moving the eye to the predetermined position if detecting means detects that the eye is not in the
15 predetermined position.

31. The apparatus of claim 30, wherein the feedback means comprises a feedback device operable to provide an audible or visual feedback signal to the subject to assist the subject in moving the eye to the predetermined position.
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32. The apparatus of claim 28, wherein the dispensing means comprises a piezoelectric droplet jet dispenser or a thermal droplet jet dispenser.

33. A method for administering a liquid to an eye of a subject,
25 comprising:

detecting the position of the eye relative to a predetermined position with an eye-position detector; and

dispensing the liquid into the eye with a liquid dispenser if the eye is in the predetermined position.
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34. The method of claim 33, further comprising automatically providing feedback information to the subject if the eye-position detector detects that the

eye is not in the predetermined position so that the subject can move the eye to the predetermined position.

35. The method of claim 33, wherein dispensing the liquid into the eye
5 comprises dispensing the liquid from a jet dispenser.

36. The method of claim 35, wherein the jet dispenser comprises a
plurality of ejection nozzles and dispensing the liquid comprises dispensing the
liquid from one or more selected nozzles of the plurality of nozzles.
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37. The method of claim 33, comprising generating an image of the eye
to detect the position of the eye relative to the predetermined position.

38. The method of claim 37, wherein the act of detecting the position of
15 the eye comprises generating a digital image of the eye, and processing the
digital image to determine the position of the eye relative to the predetermined
position.

39. The method of claim 33, further comprising selecting a location on
20 the eye surface for administering the liquid, prior to the act of detecting the
position of the eye.

40. The method of claim 33, further comprising acquiring from user
input, via a user interface software program, one or more operating parameters of
25 the liquid dispenser.

41. The method of claim 33, wherein one of said operating parameters
is the dosage of the liquid to be dispensed into the eye.

42. A system for administering a fluid to an eye of a subject,
30 comprising:

an image pick-up device for capturing an image of the eye and generating a digitized image of the eye;

an image processor for processing the digital image of the eye to determine whether the eye is in a predetermined position for administering the
5 fluid to the eye;

a feedback device for generating a feedback signal if the image processor determines that the eye is not in the predetermined position, the feedback signal comprising an audible or visual signal corresponding to a direction for moving the eye toward the predetermined position;

10 an applicator for dispensing the fluid into the eye when the eye is in the predetermined position, the applicator comprising a spectacle frame for wearing on the head of the subject, a fluid reservoir for containing the fluid, and a jet dispenser supported by the frame proximate the eye, the jet dispenser being fluidly connect to the fluid reservoir for receiving the fluid, the jet dispenser
15 configured to dispense a controlled amount of the fluid into the eye;

a controller operable to control the jet dispenser to dispense the fluid; and
a user interface software program for acquiring user input for setting operating parameters of the system.